**3GPP TSG-CT WG4 Meeting #98eC4-203xxx**

**E-Meeting, 02nd – 12th June 2020** *Revision of 3117, 3414, 3478, incorporates 3118-3122*

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.244** | **CR** | **0427** | **rev** | **3** | **Current version:** | **16.3.1** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Downlink data reordering - new feature definition | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16, 5GS\_Ph1-CT | | | | |  | ***Date:*** | | | 2020-05-19 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | CR2339-TS23.501 (S2-2003294) and CR2280-TS23.502 (S2-2003293) modify the DL data reordering functionality for Service Request procedures (see clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29]). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * New clause is added that specifies CP and UP functionality during the UE Triggered Service Request with, or without I-SMF insertion/change/removal procedures. * New condition is added to Reporting Triggers IE in Create/Update URR IE within PFCP Session Establishment/Modification Request. * New flag, REMR is added to the Reporting Triggers IE definition. * New flag, EMRR is added to the Usage Report Trigger IE definition. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misalignment with stage 2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.x (new), 7.5.2.4, 7.5.4.4, 8.2.19, 8.2.41. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 23.501 CR 2339, TS 23.502 CR 2280 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1: CRs 428-432 (C4-203118-22) are merged into this CR and the cover sheet is updated. WIC changed from CUPS-CT to 5GS\_Ph1-CT. Editorials fixed.  Rev2:   * In the PFCP Session Report Request, a Report Type IE is relpaced with Usage Report IE (when an UPF receives the End Marker and informs the SMF). * Because of the above, changes to clauses 7.2.5.8, 8.2.21 are not needed anymore. Instead, new EMRR flag is specified in the Usage Report IE (clause 8.2.41). * Cover sheet updated accordingly.   Rev3: "Once the End Marker packet identified by PDR-2 or PDR-4 is received…" is replaced with "Once the End Marker packet is received from the old I-UPF…". | | | | | | | | |

\* \* \* First Change \* \* \* \*

#### 5.2.2.x End Marker Reception Reporting

The CP function may request the UP function to report the End Marker reception during UE Triggered Service Request with, or without I-SMF insertion/change/removal procedures (see clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29]):

- If a new I-UPF is selected by the SMF to replace the old I-UPF, the SMF may provide two PDRs to the new I-UPF, e.g. PDR-1 for DL data from the PSA UPF and e.g. PDR-2 for receiving the buffered DL data from the old I-UPF. In this case, the SMF shall indicate to the new I-UPF to report the reception of the End Marker packet from the old I-UPF, by providing URR related to PDR-2 with REMR flag set to 1 in the Reporting Triggers IE, which is included in a Create URR IE within PFCP Session Establishment Request.

- If the SMF removes the old I-UPF but does not replace it with a new I-UPF, then the SMF may provide two PDRs to the PSA UPF, e.g. PDR-3 for receiving DL data across N6 and e.g. PDR-4 for receiving the buffered DL data from the old I-UPF. The SMF shall indicate to the PSA UPF to report the reception of the End Marker packet from the old I-UPF, by providing URR related to PDR-4 with REMR flag set to 1 in the Reporting Triggers IE which is included in an Update URR IE within PFCP Session Modification Request.

Once the End Marker packet is received from the old I-UPF, the UPF (either new I-UPF or the PSA UPF) shall inform the SMF about this by sending the PFCP Session Report Request with Usage Report IE, where EMRR flag shall be set to 1 in a Usage Report Trigger IE. The SMF shall instruct the UPF to start sending the buffered DL data identified by PDR-1 or PDR-3 by sending PFCP Session Modification Request. The Apply Action IE in the FAR related to PDR-1/PDR-3 shall be changed from BUFF to FORW.

\* \* \* 2nd Change \* \* \* \*

#### 7.5.2.4 Create URR IE within PFCP Session Establishment Request

The Create URR grouped IE shall be encoded as shown in Figure 7.5.2.4-1.

Table 7.5.2.4-1: Create URR IE within PFCP Session Establishment Request

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 | |  | | Create URR IE Type = 6 (decimal) | | | | | | | | | | | |
| Octets 3 and 4 | |  | | Length = n | | | | | | | | | | | |
| Information elements | | P | | Condition / Comment | | Appl. | | | | | | | | IE Type | |
| Sxa | | Sxb | | Sxc | | N4 | |
| URR ID | | M | | This IE shall uniquely identify the URR among all the URRs configured for this PFCP session. | | X | | X | | X | | X | | URR ID | |
| Measurement Method | | M | | This IE shall indicate the method for measuring the network resources usage, i.e. whether the data volume, duration (i.e. time), combined volume/duration, or event shall be measured. | | X | | X | | X | | X | | Measurement Method | |
| Reporting Triggers | | M | | This IE shall indicate the trigger(s) for reporting network resources usage to the CP function, e.g. periodic reporting or reporting upon reaching a threshold, or envelope closure, or when an SMF instructs an UPF to report the reception of the End Marker packet from the old I-UPF during a Service Request procedure (see clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29]). | | X | | X | | X | | X | | Reporting Triggers | |
| Measurement Period | | C | | This IE shall be present if periodic reporting is required. When present, it shall indicate the period for generating and reporting usage reports. | | X | | X | | X | | X | | Measurement Period | |
| Volume Threshold | | C | | This IE shall be present if volume-based measurement is used and reporting is required upon reaching a volume threshold. When present, it shall indicate the traffic volume value after which the UP function shall report network resources usage to the CP function for this URR. | | X | | X | | X | | X | | Volume Threshold | |
| Volume Quota | | C | | This IE shall be present if volume-based measurement is used and the CP function needs to provision a Volume Quota in the UP function (see clause 5.2.2.2)  When present, it shall indicate the Volume Quota value. | | - | | X | | X | | X | | Volume Quota | |
| Event Threshold | | C | | This IE shall be present if event-based measurement is used and reporting is required upon reaching an event threshold. When present, it shall indicate the number of events after which the UP function shall report to the CP function for this URR. | | - | | X | | X | | X | | Event Threshold | |
| Event Quota | | C | | This IE shall be present if event-based measurement is used and the CP function needs to provision an Event Quota in the UP function (see clause 5.2.2.2)  When present, it shall indicate the Event Quota value. | | - | | X | | X | | X | | Event Quota | |
| Time Threshold | | C | | This IE shall be present if time-based measurement is used and reporting is required upon reaching a time threshold. When present, it shall indicate the time usage after which the UP function shall report network resources usage to the CP function for this URR. | | X | | X | | X | | X | | Time Threshold | |
| Time Quota | | C | | This IE shall be present if time-based measurement is used and the CP function needs to provision a Time Quota in the UP function (see clause 5.2.2.2)  When present, it shall indicate the Time Quota value | | - | | X | | X | | X | | Time Quota | |
| Quota Holding Time | | C | | This IE shall be present, for a time, volume or event-based measurement, if reporting is required and packets are no longer permitted to pass on when no packets are received during a given inactivity period.  When present, it shall contain the duration of the inactivity period. | | - | | X | | X | | X | | Quota Holding Time | |
| Dropped DL Traffic Threshold | | C | | This IE shall be present if reporting is required when the DL traffic being dropped exceeds a threshold.  When present, it shall contain the threshold of the DL traffic being dropped. | | X | | - | | - | | X | | Dropped DL Traffic Threshold | |
| Quota Validity Time | | C | | This IE shall be present if reporting is required when the Quota Validity time for a given Quota is over. | | - | | X | | - | | X | | Quota Validity Time | |
| Monitoring Time | | O | | When present, this IE shall contain the time at which the UP function shall re-apply the volume or time threshold. | | X | | X | | X | | X | | Monitoring Time | |
| Subsequent Volume Threshold | | O | | This IE may be present if the Monitoring Time IE is present and volume-based measurement is used.  When present, it shall indicate the traffic volume value after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | | X | | X | | X | | X | | Subsequent Volume Threshold | |
| Subsequent Time Threshold | | O | | This IE may be present if the Monitoring Time IE is present and time-based measurement is used.  When present, it shall indicate the time usage after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | | X | | X | | X | | X | | Subsequent Time Threshold | |
| Subsequent Volume Quota | | O | | This IE may be present if Monitoring Time IE is present and volume-based measurement is used (see clause 5.2.2.2).  When present, it shall indicate the Volume Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Volume Quota | |
| Subsequent Time Quota | | O | | This IE may be present if Monitoring Time IE is present and time-based measurement is used (see clause 5.2.2.2)  When present, it shall indicate the Time Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Time Quota | |
| Subsequent Event Threshold | | O | | This IE may be present if the Monitoring Time IE is present and event-based measurement is used.  When present, it shall indicate the number of events after which the UP function shall report to the CP function for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Event Threshold | |
| Subsequent Event Quota | | O | | This IE may be present if Monitoring Time IE is present and event-based measurement is used (see clause 5.2.2.2).  When present, it shall indicate the Event Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Event Quota | |
| Inactivity Detection Time | | C | | This IE shall be present if time-based measurement is used and the time measurement need to be suspended when no packets are received during a given inactivity period. When present, it shall contain the duration of the inactivity period. | | - | | X | | X | | X | | Inactivity Detection Time | |
| Linked URR ID | | C | | This IE shall be present if linked usage reporting is required. When present, this IE shall contain the linked URR ID which is related with this URR (see clause 5.2.2.4).  Several IEs with the same IE type may be present to represent multiple linked URRs which are related with this URR. | | - | | X | | X | | X | | Linked URR ID | |
| Measurement Information | | C | | This IE shall be included if any of the following flag is set to "1".  Applicable flags are:  - Measurement Before QoS Enforcement Flag: this flag shall be set to "1" if the traffic usage before any QoS Enforcement is requested to be measured.  - Inactive Measurement Flag: this flag shall be set to "1" if the measurement shall be paused (inactive). The measurement shall be performed (active) if the bit is set to "0" or if the Measurement Information IE is not present in the Create URR IE.  - Reduced Application Detection Information Flag: this flag may be set to "1", if the Reporting Triggers request to report the start or stop of application, to request the UP function to only report the Application ID in the Application Detection Information, e.g. for envelope reporting.  - Immediate Start Time Metering Flag: this flag may be set to "1" if time-based measurement is used and the UP function is requested to start the time metering immediately at receiving the flag. .  - Measurement of Number of Packets Flag: this flag may be set to "1" when the Volume-based measurement applies, to request the UP function to report the number of packets in UL/DL/Total in addition to the measurement in octet. | | -  -  -  -  X | | X  X  X  X  X | | X  -  -  X  X | | X  X  X  X  X | | Measurement Information | |
| Time Quota Mechanism | | C | | This IE shall be present if time-based measurement based on CTP or DTP is used. | | - | | X | | - | | - | | Time Quota Mechanism | |
| Aggregated URRs | | C | | This IE shall be included if the URR is used to support a Credit Pool.  Several IEs with the same IE type may be present to provide multiple aggregated URRs. | | - | | X | | - | | - | | Aggregated URRs | |
| FAR ID for Quota Action | | C | | This IE may be present if the Volume Quota IE and/or the Time Quota IE and/or Event Quota IE is provisioned in the URR and the UP Function indicated support of the Quota Action feature.  When present, it shall contain the identifier of the substitute FAR the UP function shall apply, for the traffic associated to this URR, when exhausting any of these quotas. See NOTE 1. | | - | | X | | X | | X | | FAR ID | |
| Ethernet Inactivity Timer | | C | | This IE shall be present if Ethernet traffic reporting is used and the SMF requests the UP function to also report inactive UE MAC addresses.  When present, it shall contain the duration of the Ethernet inactivity period. | | - | | - | | - | | X | | Ethernet Inactivity Timer | |
| Additional Monitoring Time | | O | | When present, this IE shall contain the time at which the UP function shall re-apply the volume or time or event threshold/quota provisioned in the IE.  Several IEs with the same IE type may be present to provide multiple Monitoring Times. | | X | | X | | X | | X | | Additional Monitoring Time | |
| Number of Reports | | O | | This IE may be present if the UP function supports the NORP feature. When present, it shall indicate the number of usage reports to be generated by the URR. See also clauses 5.2.2.2.1 and 5.2.2.3.1. See NOTE 2. | | X | | X | | X | | X | | Number of Reports | |
| NOTE 1: The substitute FAR used when exhausting a Volume Quota or Time Quota may be set to drop the packets or redirect the traffic towards a redirect destination as specified in clause 5.4.7.  NOTE 2: This IE may be provisioned and set to "1" e.g. for a URR with the Dropped DL Traffic Threshold used for the Pause of Charging feature, if the UP function supports the NORP feature. | | | | | | | | | | | | | | | |

Table 7.5.2.4-2: Aggregated URRs

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  | Aggregated URRs = 118 (decimal) | | | | | |
| Octets 3 and 4 |  | Length = n | | | | | |
| Information elements | P | Condition / Comment | Appl. | | | | IE Type |
| Sxa | Sxb | Sxc | N4 |
| Aggregated URR ID | M | This IE shall be present for the aggregated URR ID of the URR sharing the credit pool. | - | X | - | - | Aggregated URR ID |
| Multiplier | M | This IE shall be included to measure the abstract service units the traffic of the corresponding aggregated URR consumes from the credit pool. | - | X | - | - | Multiplier |

Table 7.5.2.4-3: Additional Monitoring Time

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 |  | Additional Monitoring Time = 147 (decimal) | | | | | |
| Octets 3 and 4 |  | Length = n | | | | | |
| Information elements | P | Condition / Comment | Appl. | | | | IE Type |
| Sxa | Sxb | Sxc | N4 |
| Monitoring Time | M | This IE shall be present and contain the time at which the UP function shall re-apply the volume or time threshold/quota. | X | X | X | X | Monitoring Time |
| Subsequent Volume Threshold | O | This IE may be present if the Monitoring Time IE is present and volume-based measurement is used.  When present, it shall indicate the traffic volume value after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | X | X | X | X | Subsequent Volume Threshold |
| Subsequent Time Threshold | O | This IE may be present if the Monitoring Time IE is present and time-based measurement is used.  When present, it shall indicate the time usage after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | X | X | X | X | Subsequent Time Threshold |
| Subsequent Volume Quota | O | This IE may be present if Monitoring Time IE is present and volume-based measurement is used (see clause 5.2.2.2).  When present, it shall indicate the Volume Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | - | X | X | X | Subsequent Volume Quota |
| Subsequent Time Quota | O | This IE may be present if Monitoring Time IE is present and time-based measurement is used (see clause 5.2.2.2)  When present, it shall indicate the Time Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | - | X | X | X | Subsequent Time Quota |
| Subsequent Event Threshold | O | This IE may be present if the Monitoring Time IE is present and event-based measurement is used.  When present, it shall indicate the number of events after which the UP function shall report to the CP function for this URR for the period after the Monitoring Time. | - | X | X | X | Event Threshold |
| Subsequent Event Quota | O | This IE may be present if Monitoring Time IE is present and event-based measurement is used (see clause 5.2.2.2).  When present, it shall indicate the Event Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | - | X | X | X | Event Quota |

\* \* \* 3rd Change \* \* \* \*

#### 7.5.4.4 Update URR IE within PFCP Session Modification Request

The Update URR grouped IE shall be encoded as shown in Figure 7.5.4.4-1.

Table 7.5.4.4-1: Update URR IE within PFCP Session Modification Request

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Octet 1 and 2 | |  | | Update URR IE Type = 13 (decimal) | | | | | | | | | | | | |
| Octets 3 and 4 | |  | | Length = n | | | | | | | | | | | | |
| Information elements | | P | | Condition / Comment | | Appl. | | | | | | | | IE Type | | |
| Sxa | | Sxb | | Sxc | | N4 | |
| URR ID | | M | | This IE shall uniquely identify the URR among all the URRs configured for that PFCP session | | X | | X | | X | | X | | URR ID | | |
| Measurement Method | | C | | This IE shall be present if the measurement method needs to be modified.  When present, this IE shall indicate the method for measuring the network resources usage, i.e. whether the data volume, duration (i.e. time), combined volume/duration, or event shall be measured. | | X | | X | | X | | X | | Measurement Method | | |
| Reporting Triggers | | C | | This IE shall be present if the reporting triggers needs to be modified.  When present, this IE shall indicate the trigger(s) for reporting network resources usage to the CP function, e.g. periodic reporting or reporting upon reaching a threshold, or envelope closure, or when an SMF instructs an UPF to report the reception of the End Marker packet from the old I-UPF during a Service Request procedure (see clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29]). | | X | | X | | X | | X | | Reporting Triggers | | |
| Measurement Period | | C | | This IE shall be present if the Measurement Period needs to be modified.  When present, it shall indicate the period for generating and reporting usage reports. | | X | | X | | X | | X | | Measurement Period | | |
| Volume Threshold | | C | | This IE shall be present if the Volume Threshold needs to be modified. When present, it shall indicate the traffic volume value after which the UP function shall report network resources usage to the CP function for this URR. | | X | | X | | X | | X | | Volume Threshold | | |
| Volume Quota | | C | | This IE shall be present if the Volume Quota needs to be modified.  When present, it shall indicate the Volume Quota value. | | - | | X | | X | | X | | Volume Quota | | |
| Time Threshold | | C | | This IE shall be present if the Time Threshold needs to be modified. When present, it shall indicate the time usage after which the UP function shall report network resources usage to the CP function for this URR. | | X | | X | | X | | X | | Time Threshold | | |
| Time Quota | | C | | This IE shall be present if the Time Quota needs to be modified.  When present, it shall indicate the Time Quota value. | | - | | X | | X | | X | | Time Quota | | |
| Event Threshold | | C | | This IE shall be present if Event Threshold needs to be modified.  When present, it shall indicate the number of events after which the UP function shall report to the CP function for this URR. | | - | | X | | X | | X | | Event Threshold | |
| Event Quota | | C | | This IE shall be present if Event Quota needs to be modified.  When present, it shall indicate the Event Quota value. | | - | | X | | X | | X | | Event Quota | |
| Quota Holding Time | | C | | This IE shall be present if the Quota Holding Time needs to be modified.  When present, it shall contain the duration of the Quota Holding Time. | | - | | X | | X | | X | | Quota Holding Time | | |
| Dropped DL Traffic Threshold | | C | | This IE shall be present if the Dropped DL Threshold needs to be modified.  When present, it shall contain the threshold of the DL traffic being dropped. | | X | | - | | - | | X | | Dropped DL Traffic Threshold | | |
| Quota Validity Time | | C | | This IE shall be present if Quota Validity time was not sent earlier or quota validity time value needs to be modified. | | - | | X | | - | | X | | Quota Validity Time | | |
| Monitoring Time | | C | | This IE shall be present if the Monitoring Time needs to be modified. When present, this IE shall contain the time at which the UP function shall re-apply the volume or time threshold. | | X | | X | | X | | X | | Monitoring Time | | |
| Subsequent Volume Threshold | | C | | This IE shall be present if the Subsequent Volume Threshold needs to be modified and volume-based measurement is used.  When present, it shall indicate the traffic volume value after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | | X | | X | | X | | X | | Subsequent Volume Threshold | | |
| Subsequent Time Threshold | | C | | This IE shall be present if the Subsequent Time Threshold needs to be modified. When present, it shall indicate the time usage value after which the UP function shall report network resources usage to the CP function for this URR for the period after the Monitoring Time. | | X | | X | | X | | X | | Subsequent Time Threshold | | |
| Subsequent Volume Quota | | C | | This IE shall be present if the Subsequent Volume Quota needs to be modified.  When present, it shall indicate the Volume Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Volume Quota | | |
| Subsequent Time Quota | | C | | This IE shall be present if the Subsequent Time Quota needs to be modified.  When present, it shall indicate the Time Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Time Quota | | |
| Subsequent Event Threshold | | O | | This IE shall be present if the Subsequent Event Threshold needs to be modified.  When present, it shall indicate the number of events after which the UP function shall report to the CP function for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Event Threshold | |
| Subsequent Event Quota | | O | | This IE shall be present if the Subsequent Event Quota needs to be modified.  When present, it shall indicate the Event Quota value which the UP function shall use for this URR for the period after the Monitoring Time. | | - | | X | | X | | X | | Subsequent Event Quota | |
| Inactivity Detection Time | | C | | This IE shall be present if the Inactivity Detection Time needs to be modified.  When present, it shall indicate the duration of the inactivity period after which time measurement needs to be suspended when no packets are received during this inactivity period. | | - | | X | | X | | X | | Inactivity Detection Time | | |
| Linked URR ID | | C | | This IE shall be present if linked usage reporting is required. When present, this IE shall contain the linked URR ID which is related with this URR (see clause 5.2.2.4).  Several IEs with the same IE type may be present to represent multiple linked URRs which are related with this URR. | | - | | X | | X | | X | | Linked URR ID | | |
| Measurement Information | | C | | This IE shall be included if any of the following flag is set to "1".  Applicable flags are:  - Inactive Measurement Flag: this flag shall be set to "1" if the measurement shall be paused (inactive). The measurement shall be performed (active) if the bit is set to "0" or if the Measurement Information IE is not present in the Update URR IE.  - Reduced Application Detection Information Flag: this flag may be set to "1", if the Reporting Triggers request to report the start or stop of application, to request the UP function to only report the Application ID in the Application Detection Information, e.g. for envelope reporting.  - Immediate Start Time Metering Flag: this flag may be set to "1" if time-based measurement is used and the UP function is requested to start the time metering immediately at receiving the flag. | | -  -  - | | X  X  X | | -  -  X | | X  X  X | | Measurement Information | | |
| Time Quota Mechanism | | C | | This IE shall be present if time-based measurement based on CTP or DTP needs to be modified. | | - | | X | | - | | - | | Time Quota Mechanism | | |
| Aggregated URRs | | C | | This IE shall be included if the Aggregated URRs IE needs to be modified. See Table 7.5.2.4-2.  Several IEs with the same IE type may be present to provision multiple aggregated URRs.  When present, this IE shall provide the complete list of the aggregated URRs. | | - | | X | | - | | - | | Aggregated URRs | | |
| FAR ID for Quota Action | | C | | This IE shall be present if the FAR ID for Quota Action IE needs to be modified. This IE may be present if the Volume Quota IE or the Time Quota IE or Event Quota IE is newly provisioned in the URR and the UP Function indicated support of the Quota Action.  When present, it shall contain the identifier of the substitute FAR the UP function shall apply, for the traffic associated to this URR, when exhausting any of these quotas. See NOTE 1. | | - | | X | | X | | X | | FAR ID | | |
| Ethernet Inactivity Timer | | C | | This IE shall be present if the Ethernet Inactivity Timer needs to be modified. When present, it shall contain the duration of the Ethernet inactivity period. | | - | | - | | - | | X | | Ethernet Inactivity Timer | | |
| Additional Monitoring Time | | O | | This IE shall be present if the additional Monitoring Time needs to be modified. When present, this IE shall contain the time at which the UP function shall re-apply the volume or time or event threshold/quota. See Table 7.5.2.4-3.  The CP function shall provide the full set of Additional Monitoring Times IE(s).  The UP function shall replace any Additional Monitoring Times IE(s) provisioned earlier by the new set of received IE(s). | | X | | X | | X | | X | | Additional Monitoring Time | | |
| Number of Reports | | O | | This IE may be present if the Number of Reports need to be changed. When present, it shall indicate the number of usage reports to be generated by the URR. See also clauses 5.2.2.2.1 and 5.2.2.3.1. | | X | | X | | X | | X | | Number of Reports | | |
| NOTE 1: The substitute FAR used when exhausting a Volume Quota or Time Quota may be set to drop the packets or redirect the traffic towards a redirect destination as specified in clause 5.4.7. | | | | | | | | | | | | | | | | |

\* \* \* 4th Change \* \* \* \*

### 8.2.19 Reporting Triggers

The Reporting Triggers IE shall be encoded as shown in Figure 8.2.19-1. It indicates the reporting trigger(s) for the UP function to send a report to the CP function.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Bits | | | | | | | |  |
|  | Octets | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
|  | 1 to 2 | Type = 37 (decimal) | | | | | | | |  |
|  | 3 to 4 | Length = n | | | | | | | |  |
|  | 5 | LIUSA | DROTH | STOPT | START | QUHTI | TIMTH | VOLTH | PERIO |  |
|  | 6 | REMR | IPMJL | EVEQU | EVETH | MACAR | ENVCL | TIMQU | VOLQU |  |
|  | 7 to (n+4) | These octet(s) is/are present only if explicitly specified | | | | | | | |  |

Figure 8.2.19-1: Reporting Triggers

Octet 5 shall be encoded as follows:

- Bit 1 – PERIO (Periodic Reporting): when set to "1", this indicates a request for periodic reporting.

- Bit 2 – VOLTH (Volume Threshold): when set to "1", this indicates a request for reporting when the data volume usage reaches a volume threshold

- Bit 3 – TIMTH (Time Threshold): when set to "1", this indicates a request for reporting when the time usage reaches a time threshold.

- Bit 4 – QUHTI (Quota Holding Time): when set to "1", this indicates a request for reporting when no packets have been received for a period exceeding the Quota Holding Time.

- Bit 5 – START (Start of Traffic): when set to "1", this indicates a request for reporting when detecting the start of an SDF or Application traffic.

- Bit 6 – STOPT (Stop of Traffic): when set to "1", this indicates a request for reporting when detecting the stop of an SDF or Application Traffic.

- Bit 7 - DROTH (Dropped DL Traffic Threshold): when set to "1", this indicates a request for reporting when the DL traffic being dropped reaches a threshold.

- Bit 8: - LIUSA (Linked Usage Reporting): when set to "1", this indicates a request for linked usage reporting, i.e. a request for reporting a usage report for a URR when a usage report is reported for a linked URR (see clause 5.2.2.4).

Octet 6 shall be encoded as follows:

- Bit 1 –VOLQU (Volume Quota): when set to "1", this indicates a request for reporting when a Volume Quota is exhausted.

- Bit 2 – TIMQU (Time Quota): when set to "1", this indicates a request for reporting when a Time Quota is exhausted.

- Bit 3 – ENVCL (Envelope Closure): when set to "1", this indicates a request for reporting when conditions for closure of envelope is met (see clause 5.2.2.3).

- Bit 4 – MACAR (MAC Addresses Reporting): when set to "1", this indicates a request for reporting the MAC (Ethernet) addresses used as source address of frames sent UL by the UE.

- Bit 5 – EVETH (Event Threshold): when set to "1", this indicates a request for reporting when an event threshold is reached. .

- Bit 6 – EVEQU (Event Quota): when set to "1", this indicates a request for reporting when an Event Quota is reached. .

- Bit 7 – IPMJL (IP Multicast Join/Leave): when set to "1", this indicates a request for reporting when the UPF adds or removes the PDU session to/from the DL replication tree associated with an IP multicast flow.

- Bit 8 – REMR (Report the End Marker Reception): when set to "1", the SMF instructs the UPF to report the reception of the End Marker packet for this PDR. See clause 5.2.2.2.1 and also clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29].

At least one bit shall be set to "1". Several bits may be set to "1".

\* \* \* 5th Change \* \* \* \*

### 8.2.41 Usage Report Trigger

The Usage Report Trigger IE shall be encoded as shown in Figure 8.2.41-1. It indicates the trigger of the usage report.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Bits | | | | | | | |  |
|  | Octets | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
|  | 1 to 2 | Type = 63 (decimal) | | | | | | | |  |
|  | 3 to 4 | Length = n | | | | | | | |  |
|  | 5 | IMMER | DROTH | STOPT | START | QUHTI | TIMTH | VOLTH | PERIO |  |
|  | 6 | EVETH | MACAR | ENVCL | MONIT | TERMR | LIUSA | TIMQU | VOLQU |  |
|  | 7 | Spare | Spare | Spare | Spare | EMRR | IPMJL | TEBUR | EVEQU |  |
|  | 8 to (n+4) | These octet(s) is/are present only if explicitly specified | | | | | | | |  |

Figure 8.2.41-1: Usage Report Trigger

Octet 5 shall be encoded as follows:

- Bit 1 – PERIO (Periodic Reporting): when set to "1", this indicates a periodic report.

- Bit 2 – VOLTH (Volume Threshold): when set to "1", this indicates that the data volume usage reaches a volume threshold.

- Bit 3 – TIMTH (Time Threshold): when set to "1", this indicates that the time usage reaches a time threshold.

- Bit 4 – QUHTI (Quota Holding Time): when set to "1", this indicates that no packets have been received for a period exceeding the Quota Holding Time.

- Bit 5 – START (Start of Traffic): when set to "1", this indicates that the start of traffic is detected.

- Bit 6 – STOPT (Stop of Traffic): when set to "1", this indicates that the stop of traffic is detected.

- Bit 7 - DROTH (Dropped DL Traffic Threshold): when set to "1", this indicates that the DL traffic being dropped reaches a threshold.

- Bit 8 – IMMER (Immediate Report): when set to "1", this indicates an immediate report reported on CP function demand.

Octet 6 shall be encoded as follows:

- Bit 1 – VOLQU (Volume Quota): when set to "1", this indicates that the Volume Quota has been exhausted.

- Bit 2 – TIMQU (Time Quota): when set to "1", this indicates that the Time Quota has been exhausted.

- Bit 3 - LIUSA (Linked Usage Reporting): when set to "1", this indicates a linked usage report, i.e. a usage report being reported for a URR due to a usage report being also reported for a linked URR (see clause 5.2.2.4).

- Bit 4 – TERMR (Termination Report): when set to "1", this indicates a usage report being reported (in a PFCP Session Deletion Response) for a URR due to the termination of the PFCP session, or a usage report being reported (in a PFCP Session Modification Response) for a URR due to the removal of the URR or dissociated from the last PDR.

- Bit 5 – MONIT (Monitoring Time): when set to "1", this indicates a usage report being reported for a URR due to the Monitoring Time being reached.

- Bit 6 – ENVCL (Envelope Closure): when set to "1", this indicates the usage report is generated for closure of an envelope (see clause 5.2.2.3).

- Bit 7 – MACAR (MAC Addresses Reporting): when set to "1", this indicates a usage report to report MAC (Ethernet) addresses used as source address of frames sent UL by the UE.

- Bits 8: EVETH (Event Threshold): when set to "1", this indicates a usage report is generated when an event threshold is reached.

Octet 7 shall be encoded as follows:

- Bit 1 – EVEQU (Event Quota): when set to "1", this indicates that the Event Quota has been exhausted.

- Bit 2 – TEBUR (Termination By UP function Report): when set to "1", this indicates a usage report being reported for a URR due to the termination of the PFCP session which is initiated by the UP function.

- Bit 3 – IPMJL (IP Multicast Join/Leave): when set to "1", this indicates a usage report being reported for a URR due to the UPF adding or removing the PDU session to/from the DL replication tree associated with an IP multicast flow.

- Bit 4 – EMRR (End Marker Reception Report): this indicates that the UP function has received End Marker from the old I-UPF. See clauses 4.2.3.2 and 4.23.4.3 in 3GPP TS 23.502 [29])

- Bits 5 to 8: Spare, for future use and set to "0".

At least one bit shall be set to "1". Several bits may be set to "1".

\* \* \* End of Changes \* \* \* \*